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Evidence from Italy

C. Noe'

Child n. 01/2010

e-mail: de-child@unito.it

Web site: <http://www.child-centre.it>

Family background and female's choice of male's subjects: Evidence from Italy

Chiara Noe'

Università degli studi di Milano and CHILD-Collegio Carlo Alberto

Abstract

We investigate the relationship between family background and women's choice of traditionally male's field of university degree.

Although female educational attainment surpasses that of young man in many European countries, considerable gender differentiation persists in the kinds of courses taken by young people within the educational system. A lot of research has been devoted to understanding why there are so few women in "quantitative subjects" at university. The debate on whether the gender gap is attributable to nature or nurture, or a combination of the two is still ongoing. Even-though the "starting point" remains unclear, it is crucial highlighting which factors may help to reduce this segregation.

In a period of huge growth of higher education, an important part of the variation in individuals' labour market opportunities in terms of both earnings and employment depends not only on the level of education achieved but also on the *type of field*.

This paper contributes underlining factors affecting the probability of staying in a specific field of study after three years from secondary school "Diploma" attainment in Italy. We use an ISTAT survey on secondary school leavers and we find that family background affects the probability to stay in Technical fields after three years for females and do not affect males' likelihood to stay in any field after three years.

Economic incentives, together with cultural factors, may contribute inducing girls from more educated families to choose more often male-traditional subjects. In the second part we use Italian "Employment Graduates Survey" data to test whether our results may depend on incentives from wages, employment status or job satisfaction. We do not find strong evidence that economic incentives are sufficient to explain the behaviour of girls from better family backgrounds to enrol and stay more in male-traditional field of study.

JEL classification: I21, J16

Keyword: university field, gender, Italy

Introduction and motivation

In a period of huge growth of higher education in most European countries, which are the last decades, an important part of the variation in individuals' labour market opportunities in terms of both earnings and employment depends not only on the level of education achieved but also on the type of field.

Past research underlines differences in performances for different types of university degrees. Overall, a very strong empirical fact is a superior performance of "quantitative subjects" compared to "non-quantitative" ones, both in terms of earnings and having a more stable job¹.

Moreover women's attainment in higher education steadily increased and reached the same level as, and sometimes overcome, that of men in many European countries. But considerable gender differentiation persists in the kinds of courses taken by young people within the educational system (Muller and Wolbers, 2003; Jacobs, 1995).

In Europe, in the United States and in Canada, women are over-represented in Humanities, Education, Arts while being under-represented in Engineering and Science, that is the ones with higher labour market returns (Brodley, 2000; Charles and Brodley, 2002; Charles, 2002).

It is widespread in the gender literature the idea that different fields of study are associated with unequal opportunities in the labour market: there is a link between gender segregation in education and gender segregation in occupations. Generally speaking, traditional-male fields of study give better opportunities than female ones. Some researches show that gender differences in the labour market are reduced when the highest level of education and the field of degree are taken into account².

Moreover, the European Council in Lisbon stated the necessity of increasing the number of people with a university degree. A main worry was the so-called "crisis of scientific vocations": several European countries were experiencing a fall amongst their younger generations with respect to scientific studies' enrollment.

¹ For Italy, among others Bratti and Ballarino (2009) show that graduates in Technical, Economics and Hard Science fields have the best opportunities in terms of a stable job, lower probability of being out of the labour force or unemployed were those in Humanities; Buonanno and Pozzoli (2008) quantitative subject (particularly Science, Engineering and Economics) increase the speed of transition, the employment probability and also early earning more than qualitative subjects.

² About wages gap see among others, Brown and Cocoran (1998); Cristie and Shannon (2001) and Machin and Puhani (2003). About gender unemployment and temporary contracts gap see Reimer and Steinmetz (2009).

The scarcity of presence of women in the Sciences and Engineering is a common phenomenon among Europe, the US and Canada. A lot of research has been devoted to understanding why there are so few women in “quantitative subjects” at university. Among the explanations, there are sex-linked differences in inherited ability or aptitudes, theories based on rational choice of individuals that evaluate costs and benefits, traditional sex-role socialization practices and early stereotyping, the absence of role models, family background in terms of support for involvement in non-traditional subjects and expectations, and peer influences.

The debate on whether the gender gap is attributable to nature or nurture, or a combination of the two is still ongoing. Literature seems to indicate that nurture plays an important role, so even-though the “starting point” remains unclear, it is crucial highlighting which factors may help to reduce this segregation.

Moreover, for policy matters it is interesting to understand what may favour enrolment in these subjects, especially by girls, who are becoming more and more the largest part of university population.

As ascriptive factors come to play a reduced role in shaping access to tertiary education, the relative importance of horizontal dimension of college education in generating and reproducing inequality may well be on rise. The type of education can mediate the effect of characteristics on inequality among college graduates (see Gerber and Cheung, 2008).

This paper contributes underlining factors affecting the probability of staying in a specific field of study after three years from secondary school “Diploma” attainment in Italy. It is mainly descriptive in nature, but here we focus in particular on gender and on which characteristics may partially contribute to reducing the gender gap in “quantitative” fields, traditionally preferred by males.

This paper is also the only one, to our knowledge, which explores gender educational segregation in tertiary education in Italy.

We use an ISTAT survey on secondary school leavers and we find that family background affects the probability to stay in Technical fields after three years for females and do not affect males’ likelihood to stay in any field after three years. We also find a social gradient in the choice of field for women. We show that girls coming from better backgrounds choose and remain in Engineering more than the ones from less educated family backgrounds.

Economic incentives, together with cultural factors, may contribute inducing girls from more educated families to choose more often male-traditional subjects. It is possible that daughters from better family backgrounds expect to use family social networks, so girls and boys make their choice freely, because they know that the family can help them to find a “good job” in terms of either wages or employment status. In the second part we use “Employment Graduates Survey” (GES) data to test whether our results may depend on incentives from wages, employment status or job satisfaction³.

We do not find strong evidence that economic incentives are sufficient to explain the behaviour of girls from better family backgrounds to enrol and stay more in male-traditional field of study.

The paper is organized as follows. Section 1 reports a brief survey of the existing literature. Section 2 describes the data set, the sample used in our estimation and some descriptive statistics. Section 3 outlines the econometric model and the empirical results are discussed in sections 4 and 5. Section 6 concludes.

1.1 Gender differences in human capital investment

Why gender segregation exist is an open debate. Some argue that each individual chooses the amount of human capital as well as the major, in order to maximize his benefit\cost ratio and these costs and benefits can be accounted for by including ability and labour market expectations. Different kinds of human capital are characterized by different levels of atrophy (Polachek (1981)), that is the loss in earnings potential when skills are not continuously used. It is the rate at which the human capital decays during periods of disuse, while Blakemore and Low (1984) include the atrophy concept like the obsolescence rate⁴.

Because of women and men differ in their interruptions in their labour careers, women invest in different types of human capital. Different majors’ returns, the gendered division of labour and cultural norms about gender roles may lead women to choose less lucrative specialities.

³ Job satisfaction is used to measure some no-pecuniary aspects of job that however are relevant.

⁴ Science has a higher rate of atrophy than History, so women choose more the latter than men.

Others underline differences either in skills (abilities) or in preferences and environmental determinants like gender-socialization processes and cultural processes.

Daymont and Adrisani (1984) give more emphasis on differences in taste. Expectations are important not only as to the time spent in the labour market but also about how that time is spent (about job content and nature of job) and job rewards (monetary versus other types of rewards). Men and women differ by preferences concerning labour commitment and the importance of making money. Generally women are more likely to feel the importance of opportunities to be helpful to others or to society and of opportunities to work with people rather than things. Moreover, these preferences may be influenced by labour market discrimination or also forces of socialization and of gender role stereotypes.

Last, there is evidence that man and women may have different capabilities or different mathematical skills (Paglin and Rufolo, 1990; Campbell et al, 2000; Campbell and Beaudry, 1998). Guiso et al. (2008) highlight that social conditioning and gender-biased environments have large effects on math competences. They use the PISA data (2003) to study gender differences across countries and their analysis suggests that gender gap in math scores disappears in countries with a more gender-equal culture.⁵

1.2 Family background and investment in human capital

Economic and sociological literature highlights the importance of parental education and other family related resources on individual's educational attainment both in terms of level of education and of field of study⁶. In particular, we focus on that part of research that enquires about the link between university student's choice of field and the family background effects.

In the sociological literature there are two different theories that explain how social class affects children's educational levels and that can applied also to field of study. If we apply the idea of Boudon's model: parents' social class and education generate difference in cost-benefit perceptions, because parents can give more or less accurate

⁵ They classified countries according to several measures of gender equality using The World Economic Forum's Gender Gap Index, a cultural attitudes toward women index based on some questions on The World values Survey and the political empowerment index computed from World Economic Forum.

⁶ Haveman and Wolfe, (1995).

information about the educational system and about the difficulties and opportunities of labour market of their own field of study (Erikson and Jonsson, 1996).

In role models, parents induce children to choose the same branch as they were educated or occupied in. The gender role socialization perspective stresses the importance of gender specific role modelling so children look up to their parents as they develop their educational and occupational aspirations⁷.

Van de Werfhorst et al. (2001), using Netherlands' data, test if children are likely to choose the same field of education as their fathers. Individuals from the "cultural elite" tended to choose "cultural" fields of study, while the economic elite was under-represented in cultural fields and over-represented in economics\law fields. They find that preferences are intergenerationally transmitted. Parents are especially able to provide their offspring with information about the field of study they were educated in themselves.

Rochat and Demeulmeester (2001) underlines that if it is true that fields with a higher rate of return are also more difficult, students coming from poor socio-economic backgrounds, who are also more risk-adverse than more privileged students, will choose less risky and less remunerative fields. They, using Belgian data, find support to the fact that students take into account two dimensions of their prospective educational choice (returns and chances of success) and poorest students give heavier weights to the risk component. Parental education seems also to favour more the choice of long-cycle studies than short ones.

Montmarquette et al. (2002), studying US data, find that students when choose their orientation consider the expected earnings but also that the weights given by boys and girls to pecuniary returns are different. Women give to this variable less importance, so this can explain different patterns in the choice of field of study. The idea is that majoring in Science or Engineering is more difficult, so riskier than Humanities studies. Individuals consider also the probability of success in all majors. People from less favourable socio-economic backgrounds are more risk-adverse and choose less risky fields.

Davies and Guppy (1997) use US data and examine the process by which students enter in a lucrative field of study. They find that males are much more likely than females to enrol in lucrative fields of study, net of the other background characteristics. They find a negative relationship between social class and enrolment in lucrative fields. More

⁷ Shu and Marini, (1997).

able working class students are more likely to enrol in lucrative fields such as Business and Engineering.

1.3 Gender and family background differences in human capital investment

Although both the literatures on educational gender segregation and on family background differences in education are quite rich, the research that takes into account together these two aspects is much scarcer.

We report two papers that to our knowledge aim to highlight the interaction between two important aspects that may create inequality of opportunities.

Hansen (1997) studies the influence of social and economic background on educational decisions during the complete career in the Norwegian educational system. In this research she also shows that men and women from higher-level cultural classes are more similar than those with background among the unskilled workers.

Dryler (1998), using Swedish data on upper secondary school, tries to shed light on the female segregation in certain fields of study by analysing how different types of family influence a child's choice.

In particular, she tries to understand the role of family background on the choice of field of study of their children and how the sex of parents interacts with educational choice of their offspring.

In relation with how role models can work, she makes four different hypotheses on the parents' influences on the choice of field of study of children.

Same-sector effect: children choose more frequently educational programmes in the same field as their parent occupation\education. At the same time, role models can have effects in terms of traditional choice, so boys and girls choose gender atypical fields if their parents did the same (*sex role model effect*).

Social-origin-egalitarian effect: children from higher social background have greater probability to choose gender atypical fields of study, because parents better understand pay-offs from various alternatives.

Same-sex effect: the influence of parents is stronger when parents is of the same sex as the child or Dominance effect, the influence is that of parents who have a dominant social position.

She finds support to the “same sector” hypothesis, parent’s occupation and the education influenced their child in such a way that the latter’s likelihood of choosing an educational programme in the same field as her parent is greater than of choosing other sectors.

Moreover, she finds that highly educated parents and service class⁸ promoted gender atypical choice of study more than working class parents or those with shorter education.

In this section we show that there are some interactions between family background, choice of field of study and the existence of gender differences.

Although these two papers highlight some “cultural and sociological” aspects that influence the choice, while it also possible that there are some economic factors (see section 5. II).

2. Data and descriptive statistics

2.1 Data

The data used in this first section of this paper are the last waves (2004) of the “Percorsi di studio e di lavoro dei diplomati”⁹, a cross-sectional sample of high school leavers, observed three years after graduation, conducted by the Italian National Statistics Office (ISTAT).

Surveys contain information on high school curriculum, post high school experiences, either at university or in the labour market, personal characteristics and family background.

The sample contains about 20,000 individuals in each wave and represents approximately 5% of the population of Italian secondary school graduates.

We are interested in studying the probability of remaining in a particular field after three years from university enrolment. We drop from the original sample high school leavers who do not immediately enrol at university after high school (late enrolment), then we eliminate drop-out (because for some waves we don’t know subjects in which they enrolled), we drop students who change their field of study during university

⁸ She uses Goldthorpe and Erikson classification, (1992). Service class are employers who have a certain level of autonomy, but this last is based on trust and not by contract.

⁹ Survey on the School and Work Experiences of high school leavers.

(these students stay in their subject less than 3 years) and also students who don't specify their field¹⁰. These selections are made in order to have only people that stay permanently for three years in the field they primarily enrolled or out of university¹¹.

We do not consider late enrolments and early enrolments in our estimations, because the group is not homogeneous in the time spent in the educational "track" chosen¹². We make the best with the available data and on the other end, these are the only data available to study recent university students' choices and performances in Italy.

At the end we use 79% of the initial sample with 16,042 individuals for 2004¹³. We acknowledge that a sample selection due to differential drop-out might induce a bias in our estimates. However, the degree of selection is not excessive given that we drop less than 1/5 of the original sample.

The dependent variable is the subject of study at university and we distinguish between six¹⁴: Hard Science (scientific group, Chemistry-Pharmacy, Biology, Geology); Medicine; Technical (Engineering and Architecture); Economics (including Business and Statistics); Social Science (Political Science and Law); Humanities (Psychology, Literature, Education, Languages, Sports).

The explanatory variables are based on the factors the literature showed as important for achieving a degree: secondary school track¹⁵ (we distinguish five categories: two different types of lyceum: classical and scientific, technical schools, professional schools and others that include artistic schools and teaching schools), final mark of exam of the exit from compulsory school (*licenza media*) as a proxy for ability¹⁶, geographical area¹⁷ (dividing among North-East, North-West, Centre and South with Islands), family background in terms of education that distinguishes the highest level

¹⁰ The percentage of missing specification of the field of study is 8.78% of whole sample.

¹¹ At the end we drop 21% of initial sample.

The rate of secondary school graduates that enrol in university is 72,7% in 2001\2002, 64,6% male and 72,6% females .

About 55% of first enrolling are 19 years-old in 2001\2002 and about 13% of first enrolling in university are 20 years old and 6% of first enrolling are 18 year-old. Source (MIUR DG Studi e Programmazione)

¹² On the same data, Di Pietro and Cutillo (2008) make a similar sample selection, in their research on drop-out in Italy, they drop "late enrolment" to ensure comparability in the analysis.

¹³ Our sample has 6451 individuals for 2004.

¹⁴ We use the same distinction of categories of subjects as in Ballarino and Bratti (2009).

¹⁵ In Italy there are different types of secondary schools, all of them allow to enrol in university: lyceum with more academic curricula, technical school educates for white collar occupations, professional school that educates for blue collar occupations and teaching school prepares for teaching job and art schools.

¹⁶ We have also scores of the high school exams, but we prefer the score of junior high school because it may be a better proxy for ability. Moreover it is more comparable across individuals since there is no tracking in Italy at lower secondary level.

¹⁷ The geographical area is the region of the school, but only 3.25% live in a different region.

of qualification between the two parents: low education, high school attainment, at most one with university degree and both with university degree¹⁸.

We already summarized that in the sociological literature and in some empirical economic research, it is widely accepted that the behaviour about the choice of field of study of sons and daughters from higher social classes are similar. Children from more educated families have less traditional views of gender role, for example that women have their appropriate role at home or in “nurturing” occupations. This view may also be reflected in the educational and occupational aspirations and in the choice of field of study that could be less-stereotyped.

We carry out separate regressions for females and males in order to test the hypothesis that girls coming from more educated families might choose more male-traditional subjects and boy might choose more female-traditional fields of study.

For the main analysis we use the wave of 2001 leavers, however to check the robustness of our results, we replicate the same model also for the previous two waves of 1995 and 1998 leavers.¹⁹ We choose the 2001 wave because it is the only one providing detailed earnings data on graduates, which are used in section 5.II.

2.2 Descriptive statistics

In 2001 the percentage of high school leavers who enrol in university is 62%, 10% points higher than in 1998. Female enrolment surpasses male one (66% vs. 57 %). This event is not new, in fact the advantage of women is widening in 2001, from 7% in 1995 to 10 % in 2001.

We consider now our sample and compute some descriptive statistics. The magnitude is slightly different from the original sample.

At the geographical level, a slightly higher rate of enrolment is registered in the Centre of Italy. The Centre together with the South of Italy presents the largest gender gap in enrolment rate, around 14 points, while the smallest one is in the North-East, only 4 % and in the North-West is about 7% .

The type of secondary school is important for the decision to enrol at university (see Table II). For example, 95% of individuals from lyceum enrolls in university, while only

¹⁸ See in appendix for descriptive statistics.

¹⁹ The sample of 2001 is 4576 and the sample of 1998 wave is constituted of 6670 individuals. 18,943 units for 2001 and 17,074 individuals for 1998.

24% from professional schools. After three years, 95% of individuals come from lyceum, while 18% are graduated at professional high schools.

Secondary high school	
Professional School	13
Technical School	36
Scientific Lyceum	95
Classical Lyceum	95
Others School	50

Table II: Percentage of enrolment in university from different type of secondary school.

While there is little difference between girls and boys in the rate of enrolment when students come from lyceum, girls coming from any other type of secondary school enrol more in university than their male colleagues (see Table III).

Secondary High school			
	Female	Male	Total
Professional School	15	9	13
Technical School	40	34	36
Scientific Lyceum	94	95	94
Classical Lyceum	94	95	95
Others School	52	37	50

Table III: Percentage of enrolment in university from different type of secondary school and gender for 2004 wave.

Generally girls perform better at school, their pattern is more regular than boy's one, both in terms of less failures and higher score at the high school final exam.

The rate of enrolment increases with final high school score, for the lowest score the rate is 28% and for the highest it is about 83% (see Table IV).

Final mark at High school		
	Male	Female
60-69	24	33
70-79	46	50
80-89	68	66
90-100	84	82

Table IV: Percentage of enrolment in university by high school mark.

As to gender, we note that for the two bottom categories of score²⁰, the rate of enrolment is higher for women (33% for females versus 24% for males for scores between 60-69 on 100 and 50% versus 46% for score in the range 70-79 on 100) while for the highest ones males slightly surpass females (2% more).

Parent's education		
	Father	Mother
No education or elementary education	31	30
Junior secondary school	39	41
High secondary school	63	65
University Degree	88	91

Table V: Percentage of enrolment in university by parents' education

From the descriptive statistics, we note that social background in terms of father's education affects the choice of high school and from both channels it might affect university enrolment (see Table V).

Increasing family education the percentage of enrolment in university rises. Only 31% percent of individuals with a father with low education enrol in university, the rate

²⁰ In Italy since 1998 in order to obtain the Diploma, the mark of final exam in High school is a value from 60 to 100.

increases up to 88% percent when the father has a university degree. The effect is slightly stronger for mother's education, about 2% more (see appendix, Table C).

When we look at the choice of subject, there are clear differences between females and males. Women prefer Humanities, Medicine and Political Science, while men prefer more Engineering. In Humanities, women are 80% of total students while they are only 30 % of the student body in the Technical subjects (see table VI).

	Subject	
	Male	Female
Hard Science	48.60	51.40
Medicine	25.78	74.22
Technical	72.19	27.81
Economics	48.16	51.84
Political Science	35.98	64.02
Humanities	21.65	78.35

Table VI: percentage of male and female in field of study in 2004 sample

Italy presents the same separation in field of study between females and males as the vast majority of Western countries.

The share of total enrolment increases for Technical and Medicine in 2001, Economics and Political Science decrease, while the others remain stable (see Appendix).

3 The Econometric Model

In this paper the choice of individuals, the dependent variable, takes a nominal (unordered) response outcome with more than two categories, so we decided to use the Multinomial Logit model to pursue our analysis.

The high school leavers, after graduation, choose among several alternatives: Hard Science, Medicine, Technical, Economics, Political Science and Humanities.²¹

The model can be specified as:

$$U_{ik} = V_i + Z_k \theta_i + \varepsilon_i,$$

where V represents specific-individual characteristics, Z represents alternative-specific variables and ε_i is a random component that represents unobservable characteristics and measurement errors.

The idea in this model is that an individual chooses the alternative that gives him/her the maximum utility:

$$P(U_{ik}) = P(V_{ik} + Z_k \theta_i + \varepsilon_{ik} > V_{ij} + Z_j \theta_i + \varepsilon_{ij}) = P(\varepsilon_{ik} - \varepsilon_{ij} > V_{ij} + Z_j \theta_i - V_{ik} - Z_k \theta_i).$$

Now it's necessary to make assumptions on the structure of the error terms: they can be normally distributed, then the distribution of the difference is also Normal and the model specified is a multinomial probit. This model has the advantage that alternatives may not be independent but identification requires inclusion of alternative-specific variables, which are not available in our data set.

The other frequent assumption on the structure of the error terms is that their cumulative distribution function (CDF) is a type-1 extreme value distribution:

$$F(\varepsilon_i) = \exp(-e^{-\varepsilon})$$

The difference of any two realizations is distributed according to a logistic distribution (see Mc Fadden, 1974) and the probability distribution becomes:

$$P(k \in \{1, \dots, K\}) = \frac{e^{V_k}}{\sum_k e^{V_k}} = \frac{e^{X'_{k,i} \beta_k}}{\sum_j e^{X'_{j,i} \beta_j}}$$

where $P(k \in \{1, 2, \dots, K\})$ is the probability of choosing k among the K alternatives, and X contains characteristics of individuals i .

²¹ These alternatives do not have a natural order.

Parameters are estimated through Maximum Likelihood, so for any individuals we define

$d_{ij}=1$ if the j alternative is chosen and 0 otherwise, and the log-likelihood is:

$$\ln L = \sum \sum d_{ij} \ln \text{Pr ob}(Y_i = j).$$

The standard normalization employed in the literature is to use a “baseline” category against which other alternatives are assessed, via log-odd ratios. This normalization is made by setting $\beta_0 = 0$. In our case we choose Humanities the reference category.

Log-odds ratios are just the log of the ratio of the probabilities of two events, if the odd ratio is positive, the probability of being in the j alternative is greater than the base category, when the dependent variable x_k changes, and the others x_{k-1} remain constant. More interestingly, it is looking at marginal effects, the impact of a variation of a variable x_k on the probability of outcome j for individual i :

$$\delta_j = \frac{\partial P_j}{\partial X_i} = P_j [\beta_j - \sum P_k \beta_k]$$

where β is a weighted average of the β_k , $k = 0, \dots, J$. After obtaining the marginal effect for all individuals the average marginal effect can be calculated by computing the mean of individual marginal effects.

At the end of high school an individual decides whether to go to university or not. When he\she enrolls at university, he\she also chooses the field of study. In our specification, we consider this last step of the process: we calculate the probability to remain in a certain field conditional on the choice of enrolling at university²².

We underline that we use this model to study the probability to choose a specific subject and to stay in it for three years, conditional on the choice of enrolling in university immediately after the end of high school. This depends on the limitations of our data (see Section 2.1).

²² We apply the test of *independence of irrelevant alternatives* proposed by Hausmann and McFadden (1974). Our data are consistent with multinomial model assumptions (IIA), estimates should not be affected by selection bias induced by restricting the sample to students who continue to study.

4 Empirical results

In this section, we comment on the probability of being in a specific field after three years from enrolment, conditional on the choice of enrolling in some fields expressed in terms of marginal effects, which are more interesting from our point of view.

Italy presents a gender pattern similar to other Western countries, where women are more represented in Humanities and less represented in Technical subjects.

We look at marginal effects²³ of separate regressions for women in order to evaluate whether family background affects or not the choice of university majors.

Past failures reduce the likelihood of enrolling and remain in Technical and Economics subjects (around 4%). Generally students consider Technical fields more difficult than others and also like a faculty that require strong effort, therefore from this point of view we expect that less able and less motivated people have a lower presence. The fact that ability is less important for Political Science and Humanities seems in line with the literature and the idea that less able individuals may prefer such fields (considered less difficult than the Technical ones), because they expect higher chances of success in such subjects. It may be related to risk-aversion (Rochat and Demeulmesteer, 2001).

The secondary school track affects the probability of staying in specific fields; Past curriculum at secondary school is often confirmed with university choice of faculties: for example, Classical lyceum, which gives humanistic background has a large effect on the probability of choosing and staying in Political Science and Humanities (around 14%) with respect to technically oriented schools. Scientific lyceum with more scientific and mathematical curricula increases the likelihood to be in Technical (10%), Hard Science (8%) and Humanities (6%) more than a technical track.

Vocational oriented programs increase the probability of choosing and remaining in Humanities and Hard Science (about 7%).

Very interesting from our point of view is that family background affects the choice of field for females (see Table 1).

Girls with at most one parent with a degree have a higher probability of choosing and staying in Technical studies of about 4%. Women choose less Political Science when they have both parents with a degree (around 7%) or when they have one parent with a

²³ Marginal effects are computed as the average of marginal changes for all individuals in the sample.

degree (minus 5%). Females with medium educated parents have a lower probability of enrolling and staying in Economics (4%).

Better family backgrounds²⁴ for women affect also the probability of choosing and staying in Medical studies (about 4% for women coming from families with parents with one degree and 6% if both parents have a degree). This may depend on the fact that only the most able girls choose and stay in Medicine²⁵.

The result for Engineering is robust in the 1998 wave ²⁶ (see Table 3 and 4), and it is also evident for girls who have one parent with a degree and who have a lower probability of choosing and staying in Humanities.

When we look at boys' marginal effects, we can note that family background does not have any effect on the choice of field. Only for males coming from more educated families the likelihood of choosing and remaining in Technical subjects decreases by about 7% (see Table 2).

We note that there is a social gradient for women in the probability of choosing and staying in specific fields of study at university. These results may depend on the fact that women coming from better family backgrounds perform better in terms of wages or employment opportunities (economic factors) or in terms of other dimensions of jobs linked with satisfactions²⁷.

Here, we find evidence that women from higher educational background families choose and remain more in male-traditional subjects, while we do not find that men from better background choose and stay more in traditional-female subjects of study. We do not compare exactly the size of the two estimations for girls and for boys from better educated families, because for these variables in each field confidence intervals are overlapping; though the direction of behaviours of both men and women seems to support the hypothesis that who comes from more educated families makes less-traditional gender choices at least for women.

²⁴ We do not include in our regressions social class. Social class is strongly related to education of parents. Anyway, when we tried to include also this variable coded in 4 classes, our results did not change. So we prefer a more parsimonious model.

²⁵ Medicine required for enrolling the positive results of a selection test based on math, physics, chemistry, biology and logic.

²⁶ Results have the same magnitude in 1998. In the 2001 data, the result is weaker, but the number of observations are small and the estimations are less precise. We note that the rate of enrolment is very low and that these individuals who enrolled of university are more homogeneous especially in family backgrounds. Anyway, we find that girls coming from more educated parents have a lower probability to enrol and stay in Humanities (around 7%).

²⁷ We find coherent results in our estimations on wages where only women present a social gradient (see more in section 5).

5 Discussion

In the literature it is well known the link between gender segregation in education and gender segregation in occupations.

The relationship is often connected with discrimination in the labour market against women. Thomas (1990) presents a model where investments in women's human capital may be discouraged by the expectations of future labour market discrimination. Women expect to be discriminated in the labour market, especially in certain fields (traditionally-male), so they choose less these subjects.

About expectations of college students, for example, Brunello et al. (2001) on European university students data show that there are gender differences in beliefs, female students expect both lower college earnings and lower college wage gains. Moreover, family background matters. Having a mother with university degrees leads to an higher expected college wage. They find that family networks appear to be very important in finding a new job, but not for wage expectations.

Women enter more in Humanities, in Art and more generally in subjects with lower returns and this pattern has effects in terms of higher rate of unemployment and lower earnings in the labour market.

In Italy, in fact, the rate of unemployment is higher for women than for men, also for graduates. Using GES, in 2004, the rate of unemployment, after three years from graduation, is 5% for men, while for women is 8%. We have seen previously that employment status is different across subjects of study and that "quantitative" fields perform better.

Moreover, women are also over-represented in temporary work in many European countries. In Italy, after the "Treu" Law this kind of contracts became widespread since the last decade, especially among women.

Some researchers consider the greater use of temporary jobs and part-time among women as important factors of gender discrimination especially in Southern Europe (cfr Pissarides et al., 2004).

In the previous section, we found that family backgrounds have an important effect on the likelihood of choosing and staying in certain fields, especially for females. Girls with highly educated parents are more similar to boys and they choose more male-traditional fields.

This result can be explained by the fact that more educated parents differ from low educated ones in terms of ensuring educational advantage, a high quality academic environment and in instilling in their children, independently of sex, the notion that any accomplishments are possible and desirable. But it may be possible that women coming from better family backgrounds have better information or can use social networks, so they expect some family help in finding better job opportunities in the labour market despite gender segregation.

In this section, we test some possible reasons for the different behaviour of girls coming from different family backgrounds in terms of wages, employment, type of contracts and in terms of job satisfaction²⁸.

This section is divided in two part: the first presents the new dataset, the sample selection, estimation models and some descriptive statistics, then second shows the results.

5.1 The Data

We use the last wave (2004) of the “Graduates’ Employment Survey”, a cross sectional sample of university graduates conducted after three years from graduation by the Italian National Statistics Office (ISTAT) .

The survey contains information on previous educational attainments (type of secondary high school attainment (*diploma*) and final mark, degree type and final grade), employment status (kind of job, type of contract, sector, full-time or part-time contracts, number of hours), parent’s socio-economic conditions.

We choose this dataset because it presents information comparable with the one used in the previous section and moreover it contains detailed information about graduates’ employment status and wages; we use only the last wave because it was conducted at the same time as the “Survey on Diploma Holders (Diplomati)” and because other waves have salaries disaggregated in only four classes, so that any analysis would have been less precise. The sample contains 26.006 graduates: of these, about 51% are women and 49% are men.

²⁸ In literature job satisfaction is relevant to measure some no-pecuniary aspects relevant for workers.

For this analysis, we are interested in evaluating if there are differences in terms of wages, employment status or contracts type that may explain our previous results, so we use three different estimations in which the dependent variables are respectively Monthly Net Wages, Employment Status (only in terms of Working or Not Working) and a variable indicating whether the individual worker has a permanent contract or not.

The total benefit of workers from their jobs includes not only pecuniary aspects, but also qualitative ones. Hence, we study if daughters from higher family backgrounds have an advantage in terms of job satisfaction. The analysis is based on six dimensions of satisfaction and one constructed overall indicator.

Estimations have been carried out separately for women and men; we focus our attention on women's behaviour in order to better understand whether there are some interactions between the level of parents' education and the field chosen .

The idea is that women coming from more educated environments choose proportionally more traditionally male-oriented fields because they have some incentives in terms of wages or job quality thanks to their family network.

In the first estimation, we exclude observations of individuals who have a job but haven't their wages reported (these individuals represent 8,2% of the sample of workers).

The variable Wages is divided in ten interval-class²⁹; average income in 2004 for men is about 1,226 Euro and for women about 1,019 Euro³⁰. Wages are higher in Engineering and Medicine, and lower in Humanities.

For these estimation we use an interval regression model³¹ (Stewart, 1983).

As for Employment Status, we consider whether an individual has a job or not; in case he does, we consider if she\he has a permanent contract (*tempo indeterminato*) or not, so that this second analysis is conditional on employment.

For these two analyses we use a probit model separated for females and males.

²⁹ The first class is less than 250 Euro, the second between 250 and 500, the third between 501 and 750, the fourth between 751 and 1000, the fifth between 1,001 and 1,250, the sixth between 1,251 and 1,500, the seventh between 1,501 and 2,000, the eighth between 2,001 and 2,500, the ninth between 2,501 and 3,000, the last more than 3000 Euro.

³⁰ Wages refer to 2004 values.

³¹ It is a least squares two-step estimator which approximates Maximum Likelihood. It involves a particular application of the "moment" estimator in conjunction with early termination of monotonically convergent algorithm.

Workers account for 70% of the sample, but there are differences across gender: 74% of men have a job against 65% of women. The best performances in terms of job are observed in Engineering (88,7% work) and Economics (80,3%).

After three years from graduation, on average 31% of individuals have a permanent job, but women have a disadvantage of six points. The results are different across subjects; for example, for women graduated in Economics the proportion of those with a permanent job is similar to that of men.

In our data graduates report their judgement on six aspects of their work: pay, job stability, use of university knowledge, degree of autonomy, opportunity of career and “fair” tasks. Four levels of satisfaction are recorded: unsatisfied, little satisfied, quite satisfied and very satisfied. We attribute to the satisfaction variable the value zero when the worker scores the lowest level of satisfaction and the value three when the worker is very satisfied. Moreover, we construct an overall job satisfaction indicator³².

Following the literature on job satisfaction we estimate seven separated ordered probit, one for each aspect of job satisfaction and one for the global index.

Workers on average are quite satisfied, they are more satisfied on the level of autonomy and on task, while they are less satisfied on pay, career and use of skills. There are few differences for field of study. Graduates in Medicine are more satisfied on use of knowledge. Graduates in economics are more satisfied for their pay than other graduates. Women are less satisfied about their possibility of career and stability of job, but if they are graduates in Technical subjects are more satisfied on career than their colleagues.

5.II Empirical results

In the first part of our analysis, we find that daughters of highest educated parents look more similar to their male counterparts in terms of choice of field of study: the gap

³² The procedure to construct a global index is similar in the idea to that of Ghinetti (2007). We first create six dummy variables that equal one when individual satisfaction for each given attribute is four and zero otherwise. The overall indicator is the sum of the six dummies and counts the number of ones, that is the number of cases in which worker declares to be much satisfied. It takes value from zero to six, however, because only in few cases have individuals reached the highest rate, we include them into the group of those reporting a score of five, so that our overall job satisfaction indicator ranges from zero to five.

between the sexes is reduced. This implies that those women choose more frequently male faculties and this fact is important in terms of equal gender opportunities.

We then test whether there are some economic reasons for their different behaviour: at first we check if they have an advantage in terms of wages, then in terms of employment status or type of contract and last in term of job satisfactions.

We proceed with estimating an interval wage regression, separately for men and women, the reference category being individuals (female or male) with “technical” high school degree, living in the North-West, with low educated parents and with a degree in Humanities. We condition on the same independent variables used in the previous section, and we also introduce interaction terms between education and field to check if women from different parental backgrounds have different wage (or employment returns) by subject.

Looking at the wage estimation, we find that wages are highest in the North-West of Italy, with the highest score.

There is both for women and men a wage premium for graduates in Economics, Engineering, Hard Science relative to Humanities. On average, quantitative subjects perform better than non-quantitative ones (coherently with the previous literature).

We find that for females there is a family background gradient in Hard Science and in Economics, while there are not effects of parents’ education for males; there is a positive premium, for Engineering when women and men come from parents with one degree (see table 5). Hence, in general there is a social gradient in the wage returns for females only.

We do not find strong effects in terms of wages for daughters coming from more educated parents in Engineering. It is not strange that there are not large effects on wages. In fact, the literature on pay gap highlights that there exists a “glass ceiling” for women, so especially at the top of the earnings distribution of females, wages grows less than males’ do. This effect is likely to be stronger in male traditional subjects. Moreover, after three years from graduation (at entry career) the gender gap might be low, but gender differences increase over time.

We then use a probit estimation in order to evaluate if the probability to have a job is greater for women with higher educated parents.

In the table 6, we report marginal effects, their value represents the difference in probability for women or for men coming from families with different levels of

education and graduating in university major j with respect to women or men graduating in Humanities and coming from families with low education.

We can see that family background is important for women: girls graduating in Hard Science and Political Science with any level of education of family perform worse than girls graduating in Humanities and coming from low educated family in the probability of finding a job.

It is possible that if girls coming from low educated families are also poorer than other families with highest level of education, so also their reservation wages are low, and they search less and accept the first job offers.

Only graduates in Technical subjects have a higher probability of finding a job about 7% point more than when they come from lower educated family and 11% when they come from medium educated families.

It is interesting to note that the higher the level of parents' education is increasing the greater is the effect in magnitude (in absolute value) on the likelihood to find a job. We might think that daughters from better backgrounds are likely to wait more for a "good" job.

In this estimation we do not discriminate for "good" or "bad" jobs and family networks could work in the direction of securing a good job for their children. For women, it has been noted in the literature that it is more difficult to obtain a non-temporary job, fact that might highlight a component of discrimination.

When we look at the probability of obtaining a permanent contract for women with different backgrounds and graduated in different subjects, we note that Hard Science and Economics perform better than in Humanities with low educated family.

It's interesting to note that the probability to find a permanent job in Hard science increases with the level of education of the family (between 5% to 8%) and this happens also for graduates in Economics (between 19%-28% more than our reference category). While female graduates in Technical, independently of the level of parents' education, find more difficult to obtain a permanent contract than girls graduated in Humanities and coming from low educated families. This fact might be a form of discrimination against female graduates in male-traditional subjects.

For men, we can note that graduates in any field seem to have a higher probability of finding a job, especially for Technical and Economics. Only the sons of better background families graduated in Hard Science have a higher likelihood of getting a job. The career of men seems more regular in the sense that they have also a higher

probability of obtaining a permanent contract in Technical, Economics and Hard Science degrees than a man graduating in Humanities with low educated parents.

As for job satisfaction we don't find relevant differences, except for the use of skills developed at university: graduating in Medicine increases the probability of being satisfied with respect to graduates in Humanities.

About career satisfaction, graduates in any field of study different from humanities have a higher likelihood of being satisfied (see Table 7).

Our results do not support strongly the hypothesis that the choice of male traditional subjects by girls are linked to some economic incentives stronger for better family backgrounds, this choice may be depend more on cultural factors³³. We remember that these data refer to three years from graduation, at career entry, so we do not exclude that there may be future economic rewards.

6 Concluding Remarks

Two important trends have recently characterized Italian and European educational systems: a huge expansion of tertiary education and the increasing presence of women in higher education.

In a period of rapid growth of the rate of enrolment at university, labour market outcomes in the terms of both wages and employment depend on the level of attainment achieved but also on the field of study.

In fact, empirical evidence highlights that salary and transition from school to work are linked with field of study. Studying "quantitative" subjects at university gives better results in the labour market in most Western countries and this is true also for Italy.

³³ In the sample of graduates in our analysis we include all individuals who are working at the time of the interview.

But in this sample there are individuals who either work before graduating or after graduating. It may be that our results in terms of wages are affected by those individuals working before taking a degree. They represent about 15% of all sample. Women and men are equally distributed.

In order to take in consideration this argument we carry out two different robustness checks.

We restrict our analysis to the sub-sample of individuals who started to work after the degree and on our original sample we include a dummy to take account for this fact.

The results in terms of wages on both samples are similar to the main analysis.

Moreover, the European Council worries about the scarcity of enrolments in scientific fields of study. This latter gave the goal of increasing the rate of enrolment especially in these fields and of promoting female presence.

Women surpass men in the rate of enrolment at university, also in the share of university graduates. However, girls are over-represented in Humanities, Languages, Arts and vice-versa boys are more in Technical fields of study.

Some theoretical explanations are offered by economists and sociologists on the reason why women are segregated in certain fields of study. One approach underlines the rational choice of women who know their intermittent presence in the labour market because of their caring role in the family and so they choose different kinds of human capital. Other approaches highlight different preferences or role models and sex-stereotyping socialization that push women in traditional female fields.

The debate on gender education gap is still ongoing and also if “the starting point” remains unclear, it is important to understand which factors may help to reduce it.

About the choice of field, it is well known the role of family background and how family affects the level and the type of educational attainment of children.

The economic and sociological literature on field of study underlines how different social backgrounds may influence the choice of field and how this effect may be different for males and females. They put forward that children from highest social backgrounds are more free to choose the major.

The purpose of this paper is to study the probability to stay in university and in a given field three years from enrolment and how this depends on family background.

We use the “Percorsi di studio e di lavoro dei diplomati”, a cross-sectional sample of high school leavers, three years after graduation to estimate a multinomial logit model of being enrolled and remaining in a specific field of study.

We are interested to control for possible different behaviours among girls coming from different social backgrounds in term of different level of education of parents and we find that females from better backgrounds enrol more in male-traditional fields of study and less in female ones.

We identify one factor, cultural capital of parents, that can contribute to reducing gender gap in the choice of field of study. In particular we test whether the daughters from more educated parents have some kind of economic incentives from the choice of traditionally male majors, for example using family network. We test whether there is a premium in terms of wages, probability to work or to obtain permanent contracts and

job satisfaction. We find that social background is important for female in terms of wages.

However, such social gradients are not present only in Technical fields and are not stronger in these fields cannot explain the positive effect of parental education on the probability of enrolling in these subjects.

Instead, we note that family background affects the choice of male-traditional field of study; we look for some economic explanations, that together with cultural factors, can help to understand these results. We find that girls who have more educated parents only have positive incentives in terms of obtaining permanent contracts. This is another element that increases inequality of opportunity for women, indeed if she chooses to go to university, her family background affects the decision of field and through this also the future carrier both in terms of wages and employment.

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Table D : Percentage enrolment in university for different field and for gender in the first and last waves.

	Male	Female	Total	Male	Female	Total	Male	Female	Total
<i>Subject</i>	<i>1998</i>			<i>2001</i>			<i>2004</i>		
Hard Science	13.50	13.53	13.52	13.42	17.28	15.45	15.69	12.44	13.83
Medicine	4.01	3.74	3.86	4.47	4.90	4.70	3.80	8.19	6.31
Technical	26.45	6.33	15.22	26.99	8.39	17.20	33.62	9.71	19.95
Economics	19.00	13.82	16.11	20.78	17.66	19.14	16.85	13.59	14.99
Soft Science	27.29	30.28	28.96	26.73	37.63	32.46	18.40	24.52	21.90
Humanities	9.75	32.30	22.34	7.61	14.14	11.04	11.63	23.09	23.09

Table 1: Marginal effect estimation for 2004 for women

	Hard Science	Medicine	Technical	Economics	Political Science	Humanities
Private	-0.005 (0.03)	-0.024 (0.02)	-0.005 (0.02)	0.012 (0.03)	0.09** (0.04)	-0.072* (0.04)
Classic Track	-0.017 (0.02)	0.020 (0.02)	-0.000 (0.01)	-0.286 (0.02)	0.140*** (0.03)	0.142*** (0.03)
Scientific Track	0.083*** (0.02)	0.019 (0.02)	0.100*** (0.02)	-0.241*** (0.02)	-0.029 (0.02)	0.067** (0.03)
Professional Track	0.077** (0.03)	0.077*** (0.02)	-0.053*** (0.006)	-0.125*** (0.03)	-0.047 (0.03)	0.071** (0.03)
Others Track	-0.035* (0.01)	0.025 (0.02)	-0.009 (0.01)	-0.304*** (0.01)	-0.036 (0.03)	0.360*** (0.04)
Good	-0.006 (0.02)	-0.017 (0.02)	-0.023 (0.02)	0.051* (0.03)	-0.022 (0.03)	0.018 (0.04)
Very good	0.033 (0.03)	0.035* (0.02)	-0.016 (0.02)	0.05** (0.02)	-0.028 (0.03)	-0.008 (0.04)
Optimum	0.023 (0.02)	-0.007 (0.02)	0.0006 (0.02)	0.08*** (0.02)	-0.04 (0.03)	-0.056 (0.04)
Past failure	0.002 (0.02)	-0.014 (0.02)	-0.034** (0.01)	-0.041* (0.02)	0.040 (0.03)	0.047 (0.04)
Medium educated parents	0.019 (0.02)	-0.004 (0.01)	0.016 (0.01)	-0.041** (0.02)	-0.004 (0.02)	0.014 (0.02)
One degree parents	0.019 (0.02)	0.045* (0.02)	0.037** (0.02)	-0.033 (0.03)	-0.052* (0.03)	-0.017 (0.03)
Both degrees Parents	-0.028 (0.02)	0.060* (0.03)	0.037 (0.02)	0.040 (0.04)	-0.07** (0.03)	-0.032 (0.03)
North-East	-0.026 (0.01)	0.010 (0.01)	-0.015 (0.01)	0.001 (0.02)	0.019 (0.02)	0.010 (0.03)
Centre	-0.010 0.01	0.015 (0.01)	-0.0001 (0.01)	-0.001 (0.02)	0.011 (0.02)	-0.015 (0.03)
South	0.017 0.02	-0.007 (0.01)	-0.03** (0.01)	-0.013 (0.02)	0.053** (0.02)	-0.018 (0.03)

Note: Standard error in Parenthesis. ***significant at 1%, ** significant at 5%, * significant at 10%. All estimations include weights. The omitted category is female goes to public school, has parents with no education, has the score "sufficient" at junior high school, graduated from the technical high school track and with regular educational career. Numbers of observations: 3911

Table 2: Marginal effect estimation on 2004 wave for men

	Hard Science	Medicine	Technical	Economics	Political Science	Humanities
Private	-0.023 (0.05)	0.001 (0.01)	-0.077 (0.05)	0.090 (0.06)	0.032 (0.05)	-0.024 (0.04)
Classic track	-0.057** (0.03)	0.064*** (0.02)	-0.198*** (0.03)	-0.121*** (0.02)	0.212*** (0.04)	0.099*** (0.03)
Scientific track	-0.021 (0.02)	0.018* (0.01)	-0.005 (0.03)	-0.016 (0.03)	0.022 (0.02)	0.0006 (0.02)
Vocational track	0.080 (0.04)	0.044** (0.02)	-0.225*** (0.03)	0.002 (0.03)	-0.026 (0.03)	0.125*** (0.04)
Others track	-0.165 (0.01)	-0.007 (0.007)	-0.121* (0.06)	-0.109*** (0.02)	0.049 (0.05)	0.354*** (0.09)
Good	-0.033 (0.03)	0.007 (0.01)	0.008 (0.03)	0.030 (0.03)	-0.033 (0.03)	0.021 (0.03)
Very good	-0.055* (0.03)	0.0126 (0.01)	0.044 (0.04)	0.004 (0.03)	-0.033 (0.03)	0.027 (0.03)
Optimum	-0.055* (0.03)	0.017 (0.01)	0.112*** (0.04)	0.026 (0.04)	-0.068** (0.03)	-0.032 (0.03)
Past failure	0.058** (0.03)	-0.013 (0.01)	-0.170*** (0.03)	-0.014 (0.03)	0.038 (0.02)	0.100*** (0.03)
Medium educated Parents	0.005 (0.02)	-0.018* (0.01)	-0.044 (0.03)	0.018 (0.02)	0.030 (0.02)	0.0009 (0.02)
One degree parents	-0.0001 (0.03)	-0.008 (0.01)	-0.012 (0.04)	0.037 (0.04)	0.013 (0.03)	-0.031 (0.03)
Both degrees parents	-0.021 (0.03)	0.005 (0.01)	-0.078* (0.04)	0.064 (0.05)	0.013 (0.03)	0.017 (0.03)
North-East	-0.015 (0.01)	-0.004 (0.01)	-0.004 (0.03)	-0.018 (0.02)	0.047* (0.03)	-0.005 (0.02)
Centre	-0.021 (0.02)	0.016 (0.01)	-0.037 (0.03)	0.002 (0.03)	0.051* (0.03)	-0.010 (0.03)
South	-0.016 (0.02)	-0.018* (0.009)	-0.070** (0.03)	0.023 (0.03)	0.071*** (0.02)	0.009 (0.02)

Note: Standard error in Parenthesis. ***significant at 1%, ** significant at 5%, * Significant at 10%. All estimations include weights. The omitted category is male goes to public school, has parents with no education, has the score "sufficient" at junior high school, graduated from the technical high school track and with regular educational career. Numbers of observations: 2540

Robustness check analysis

Table 3: Marginal effects estimation on 2001 wave for women.

	Hard Science	Medicine	Technical	Economics	Political Science	Humanities
Medium Educated parents	-0.040 (0.02)	0.009 (0.01)	-0.009 (0.01)	-0.010 (0.03)	0.076* (0.04)	-0.026 (0.02)
One degree parents	-0.081*** (0.03)	-0.015 (0.009)	0.023 (0.02)	0.014 (0.05)	0.080 (0.06)	-0.218 (0.03)
Both degrees parents	0.013 (0.04)	0.045 (0.02)	0.019 (0.03)	-0.094** (0.05)	0.083 (0.08)	-0.066** (0.02)

Note: Standard error in Parenthesis. ***significant at 1%, ** significant at 5%, * significant at 10%. All estimations include weights. The omitted category is female goes to public school, has parents with no education, has the score "sufficient" at junior high school, graduated from the technical high school track and with regular educational career.
Number of observations:2501

Table 4: Marginal effects estimation on 1998 wave for women

	Hard Science	Medicine	Technical	Economics	Political Science	Humanities
Medium Educated parents	0.00009 (0.01)	-0.0008 (0.006)	0.002 (0.01)	0.014 (0.01)	-0.0005 (0.02)	-0.015 (0.02)
One degree parents	-0.004 (0.02)	0.018 (0.01)	0.034* (0.02)	0.016 (0.02)	-0.011 (0.03)	-0.053* (0.03)
Both degrees parents	-0.0006 (0.02)	0.020* (0.01)	0.036* (0.02)	0.004 (0.03)	-0.010 (0.04)	-0.049 (0.04)

Note: Standard error in Parenthesis. ***significant at 1%, ** significant at 5%, * significant at 10%. All estimations include weights The omitted category is female goes to public school, has parents with no education, has the score "sufficient" at junior high school, graduated from the technical high school track and with regular educational career.
Number of observations: 3972

Table 5 : Interval regression

	Women	Men
Medium	-41.08** (14.89)	68.66 (47.68)
One degree	-61.17* (31.50)	-70.83 (78.52)
Two degrees	-85.97** (41.92)	-106.28 (83.34)
Hard Science (HS)	69.44*** (23.60)	195.42*** (42.23)
Medicine (M)	122.86 (74.23)	575.50*** (80.91)
Technical (T)	106.43*** (34.82)	258.20*** (41.00)
Political Science (PSG)	41.13* (24.50)	177.90*** (52.82)
Economics (ES)	115.46*** (27.24)	175.48*** (49.71)
HS*medium	70.20** (31.53)	45.02 (55.62)
HS*one degree	96.21** (45.25)	122.99 (86.69)
HS*two degree	139.06** (54.06)	173.29* (101.32)
M*medium	284.45*** (109.38)	-59.09 (106.41)
M*one degree	188.78 (120.93)	-51.92 (136.16)
M*two degree	237.10 (138.07)	-99.52 (153.38)
T*medium	53.48 (42.48)	-19.20 (52.85)
T*one degree	109.26* (62.49)	171.27** (84.59)
T*two degree	106.99 (68.21)	153.06 (90.71)
PSG*medium	43.67 (33.36)	-64.68 (67.68)
PSG*one degree	37.26 (62.14)	116.86 (102.00)
PSG*two degree	138.74** (66.75)	39.19 (123.23)
ES*medium	104.24* (38.00)	-6.51 (64.65)
ES*one degree	110.00*** (58.91)	145.31 (97.36)
ES*two degree	178.35*** (66.16)	201.81** (94.94)
Constant	1100.34*** (23.41)	1118.40*** (41.57)
N. Observation	6856	7427

Note: Standard errors are in parentheses.***Significant at 1%,**significant at 5% and * significant at 10%. All estimations include weights. The reference category is graduate in Humanities with low educated parents.

Table 6: Marginal effect on work and on type of contract for women on 2004 wave

	Work		Permanent	
	Women		Men	
AHO*medium	0,031 (0,02)	-0,039 (0,03)	0.009 (0,03)	-0,038 (0,04)
AHO*one degree	-0,090 (0,04)	-0,044 (0,04)	-0,028 (0,05)	-0,040 (0,06)
AHO*two degree	-0,078** (0,04)	-0,124*** (0,05)	-0,084 (0,07)	-0,206*** (0,06)
HS*low	-0,060* (0,03)	0,051 (0,03)	0,039 (0,03)	0.118*** (0,04)
HS*medium	-0,065** (0,03)	0,054* (0,03)	0,015 (0,03)	0.105*** (0,04)
HS*one degree	-0,102*** (0,04)	0,083* (0,04)	0,055* (0,03)	0.128*** (0,04)
HS*two degree	-0,073 (0,05)	0,085* (0,05)	0,013 (0,04)	0.04 (0,05)
M*low	-0,451*** (0,03)	-0,372*** (0,02)	-0.245*** (0,04)	-0.329*** (0,03)
M*medium	-0,469*** (0,03)	-0,348*** (0,02)	-0.318*** (0,04)	-0.364*** (0,02)
M*one degree	-0,413*** (0,03)	-0,402*** (0,02)	-0.289*** (0,04)	-0.374*** (0,02)
M*two degree	-0,451*** (0,03)	-0,392*** (0,02)	-0.352*** (0,04)	0,379*** (0,02)
T*low	0,074** (0,03)	-0,159*** (0,03)	0.168** (0,02)	0,067* (0,03)
T*medium	0,110*** (0,03)	-0,097*** (0,03)	0.174*** (0,02)	0,144*** (0,03)
T*one degree	0,071** (0,04)	-0,134*** (0,04)	0.160*** (0,02)	0.156*** (0,04)
T*two degree	0,056 (0,04)	-0,127** (0,05)	0.153*** (0,02)	0.111** (0,04)
ES*low	0,019 (0,02)	0,192*** (0,04)	0.090** (0,02)	0.209*** (0,04)
ES*medium	0,030 (0,03)	0,280*** (0,04)	0.076** (0,03)	0.101** (0,04)
ES*one degree	0,109*** (0,03)	0,266*** (0,06)	-0,010 (0,04)	0.163*** (0,06)
ES*two degree	0,034 (0,06)	0,260*** (0,08)	0,118*** (0,03)	0.225*** (0,07)
PSG*low	-0,069** (0,03)	0,081** (0,03)	-0.068* (0,03)	0.069 (0,05)
PSG*medium	-0,098*** (0,03)	0,011 (0,03)	0,006 (0,03)	0.090** (0,04)
PSG*one degree	-0,136*** (0,04)	-0,052 (0,05)	-0.040 (0,04)	-0,139*** (0,05)
PSG*two degree	-0,142*** (0,05)	-0,057 (0,06)	-0,023 (0,04)	-0,090 (0,05)
N. Observation	12894	8427	12126	8989

Note: Standard errors are in parentheses. ***Significant at 1%, **significant at 5% and * significant at 10%. All estimations control for high school track and marks and region of residence. All estimations include weights. The reference category is graduate in Humanities, with low educated parents.

Table 7: odds-ratio of job satisfaction index for women using GES 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Use of university knowledge	Autonomy level	Tasks	<u>Pay</u>	Stability of job	Opportunities of career	Overall index of satisfaction
North-East	-0.080* (0.05)	-0.018 (0.05)	-0.023 (0.05)	-0.009 (0.04)	-0.137*** 0.05	-0.079* (0.05)	-0.061 (0.04)
Centre	-0.087* (0.05)	-0.202*** (0.05)	-0.170*** (0.04)	-0.122*** (0.04)	-0.343*** 0.04	-0.103** (0.04)	-0.226*** (0.04)
South	-0.014 (0.05)	-0.256*** (0.05)	-0.220*** (0.05)	-0.185*** (0.05)	-0.409*** 0.05	-0.122*** (0.05)	-0.330*** (0.05)
Medium educated parents	-0.171** (0.07)	0.104 (0.07)	-0.059 (0.07)	0.064 (0.06)	-0.080 0.06	0.085 (0.06)	0.025 (0.07)
One degree parent	0.030 (0.10)	0.128 (0.10)	0.066 (0.09)	0.002 (0.09)	-0.087 0.09	-0.044 (0.09)	0.062 (0.09)
Two degree parents	-0.154 (0.10)	-0.015 (0.12)	-0.055 (0.12)	-0.161 (0.13)	-0.390*** 0.12	-0.005 (0.13)	-0.192 (0.12)
Hard Science (HS)	0.096 (0.07)	0.107 (0.07)	0.046 (0.07)	0.076 (0.07)	0.045 0.07	0.179*** (0.06)	0.113 (0.07)
Medicine (M)	0.409*** (0.10)	0.031 (0.10)	0.156 (0.10)	0.064 (0.11)	-0.184* 0.10	0.188* (0.11)	0.091 (0.10)
Technical (T)	-0.110 (0.08)	0.019 (0.09)	-0.072 (0.09)	-0.083 (0.09)	-0.084 0.09	0.390*** (0.08)	0.049 (0.09)
Economics (ES)	0.038 (0.08)	0.044 (0.09)	0.010 (0.08)	0.214 (0.08)	0.448*** 0.09	0.418*** (0.08)	0.207* (0.09)
Political Science (PS)	-0.144* (0.08)	0.017 (0.08)	-0.120 (0.08)	0.033 (0.07)	0.231*** (0.08)	0.207*** (0.07)	0.081 (0.07)
HS*medium	0.07 (0.09)	-0.089 (0.09)	0.09 (0.10)	-0.024 (0.09)	0.055 0.10	-0.082 (0.09)	-0.066 (0.09)
HS*one degree	-0.094 (0.13)	-0.069 (0.13)	-0.030 (0.13)	0.040 (0.13)	0.105 (0.13)	0.014 (0.12)	-0.111 (0.13)
HS*two degree	0.036 (0.15)	-0.116 (0.16)	0.072 (0.16)	0.423** (0.17)	0.504** (0.17)	0.050 (0.17)	0.187 (0.16)
M*medium	0.146 (0.14)	-0.004 (0.14)	0.270* (0.14)	0.173 (0.15)	0.156 (0.13)	0.130 (0.15)	0.138 (0.13)
M*one degree	-0.187 (0.16)	-0.067 (0.16)	-0.002 (0.16)	0.204 (0.17)	0.173 (0.15)	0.237 (0.17)	-0.091 (0.17)
M*two degree	-0.021 (0.18)	-0.186 (0.18)	0.108 (0.19)	0.214 (0.20)	0.426** (0.18)	0.233 (0.20)	0.270 (0.18)
T*medium	0.318*** (0.10)	-0.135 (0.13)	0.097 (0.12)	0.037 (0.12)	0.144 (0.12)	-0.042 (0.11)	-0.053 (0.11)
T*one degree	0.089 (0.15)	0.07 (0.16)	0.233 (0.15)	0.189 (0.16)	0.155 (0.15)	0.299** (0.14)	0.187 (0.14)
T*two degree	0.133 (0.16)	-0.026 (0.18)	0.061 (0.19)	0.464** (0.19)	0.358** (0.18)	0.070 (0.18)	0.139 (0.19)
ES*medium	0.126 (0.11)	-0.094 (0.13)	0.072 (0.12)	0.067 (0.10)	0.350*** (0.12)	0.087 (0.10)	0.081 (0.12)
ES*one degree	0.019 (0.16)	-0.027 (0.18)	-0.160 (0.18)	0.134 (0.16)	0.034 (0.18)	0.162 (0.18)	-0.084 (0.20)
ES*two degree	-0.006 (0.18)	-0.347* (0.19)	-0.242 (0.21)	0.342* (0.20)	0.254 (0.21)	0.032 (0.24)	-0.082 (0.20)

PSG*medium	0.100 (0.11)	0.009 (0.11)	0.092 (0.11)	-0.050 (0.11)	0.020 (0.11)	0.149 (0.11)	0.002 (0.10)
PSG*one degree	0.054 (0.16)	0.225 (0.14)	0.092 (0.16)	-0.182 (0.15)	-0.028 (0.14)	0.116 (0.14)	-0.075 (0.13)
PSG*two degree	0.338* (0.17)	0.087 (0.19)	0.356* (0.19)	0.120 (0.18)	0.126 (0.19)	0.441** (0.21)	0.282 (0.15)

N. Observations	8420	8417	8418	8394	8393	8327	8327
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Note: Standard errors are in parentheses. ***Significant at 1%,**significant at 5% and * significant at 10%. All estimations control for high school track and marks. All estimations include weights. The reference category is graduate in Humanities, with low educated parents come from scientific lyceum and with lowest final score.